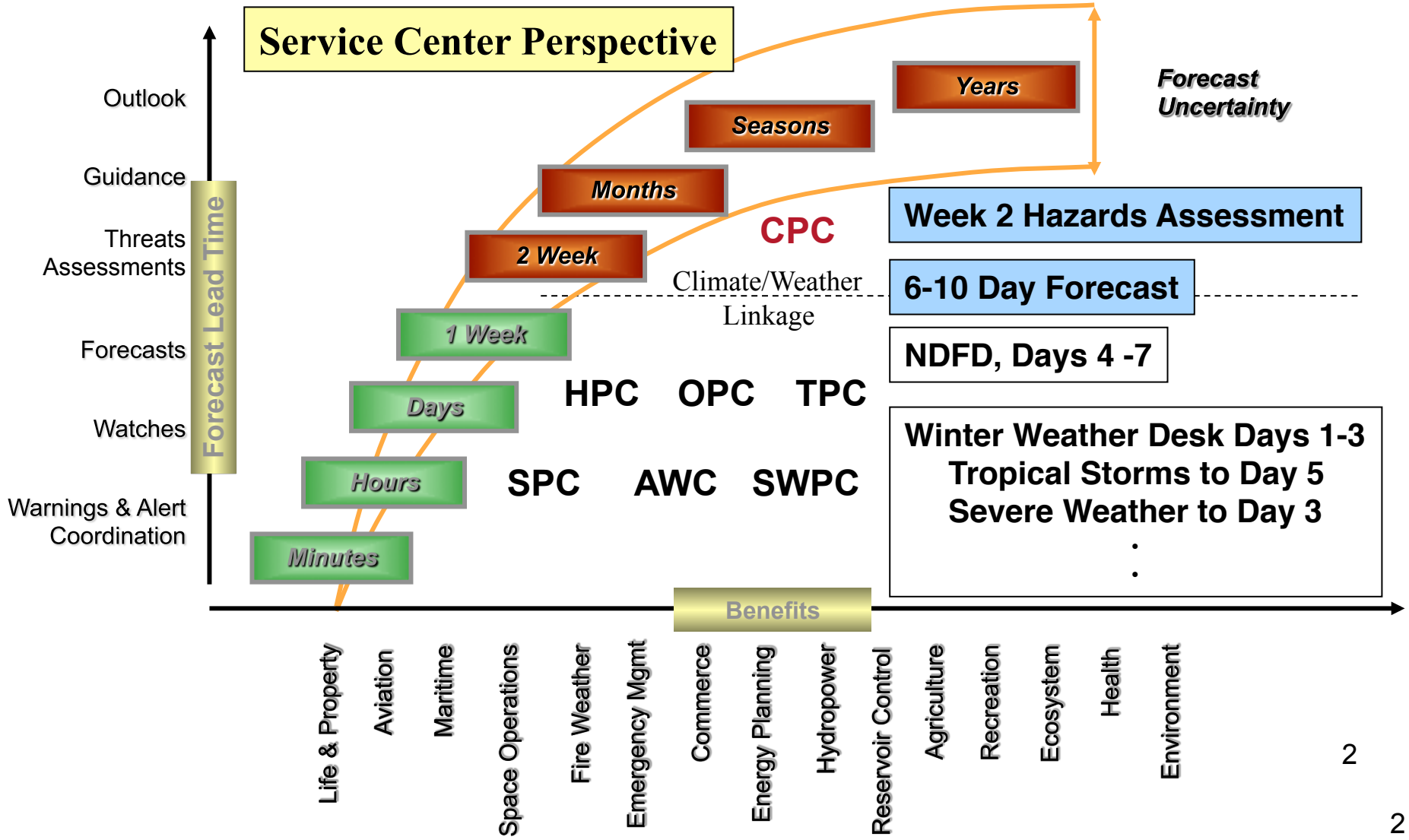
Overview of NOAA's Climate Testbed

Jon Gottschalck
(on behalf of Fiona Horsfall, CTB Director)

2nd NOAA Testbed Workshop
May 5, 2010
Boulder, CO

Targets Distinct Area of Seamless Suite



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Purpose of the Climate Testbed

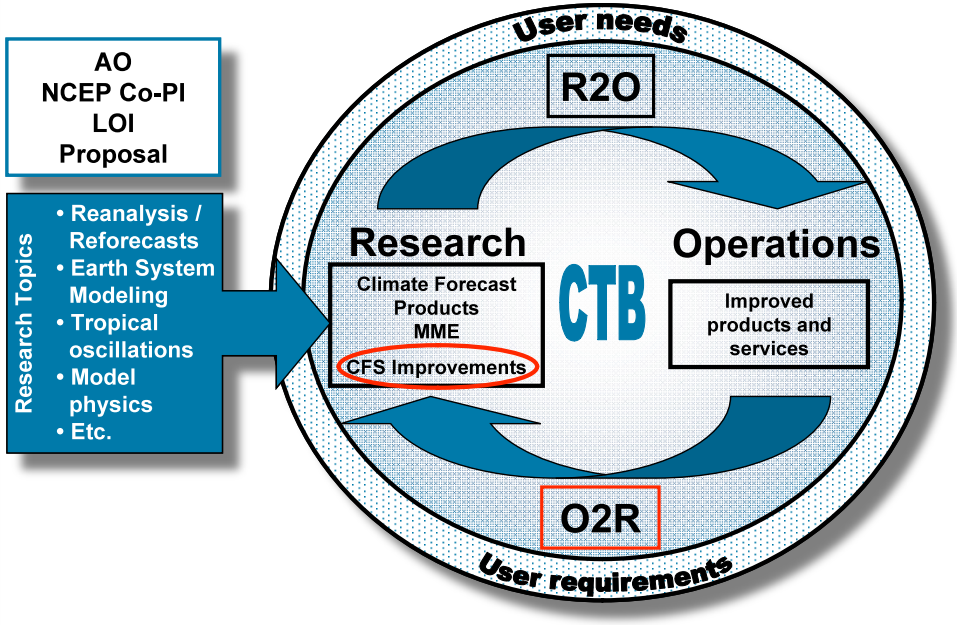
- Jointly established in 2004 by NCEP and NOAA Climate Program Office
- Serves as conduit between the operational, academic and research communities

Mission

To accelerate the transition of scientific advances from the climate research community to improved NOAA climate forecast products and services

Components of the Climate Testbed

- **Structure**
- **Focus Areas**
  --Climate Forecast System (CFS) Improvements
  --Multi Model Ensembles (MME)
  --Climate Forecast Products
- **Competitive Grants Program**
- **CTB Seminar Series**



Climate Testbed Structure

(1) Steering Committee

-- To provide guidance and knowledge on CTB issues

-- Contribute to setting priorities

T. Barnston (IRI)	**Tony Rosati (GFDL)**
T. Busalacchi (ESSIC, Univ. Maryland)	**Joe Tribbia (NCAR)**
J. Kinter (COLA)	**D. Lettenmaier (Univ. of Washington)**
M. Harrison (UKMO)	**K. Redmond (DRI)**
E. Harrison (PMEL)	**M. Suarez (GMAO)**

(2) Process

--Announcements of Opportunity (AO)

--Letters of Intent / Proposals

--Grants process managed by the Climate Program Office (CPO)

--NCEP Collaborators for projects

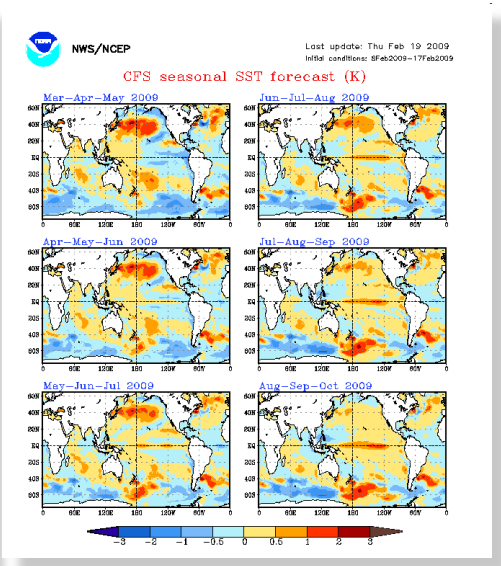
--Panel review of submitted proposals

Focus Area: CFS Improvements

Goal

To accelerate evaluation of and improvements to the operational Climate Forecast System (CFS) to enhance its use as a skillful tool in providing NCEP's climate predictions for users to address today's problems and plan for tomorrow

- **CFS V1 implemented in 2004**
  - ***Atmosphere & ocean DA***
  - ***Real time coupled 9-month forecasts***
  - ***25 years of hindcasts***
- **CFS V2 (2010)**
  - ***CFS Reanalysis & Reforecast (CFSRR) project (ongoing)***
  - ***Coupled O-A-L-Sea Ice DA 1979-2009***
  - ***Coupled reforecasts initialized from coupled reanalysis, 1981-2009***



Focus areas

- **Dynamics**
- **Physics**
- **Coupled**
  - **Ocean**
  - **Atmosphere**
  - **Land**
  - **Cryosphere**

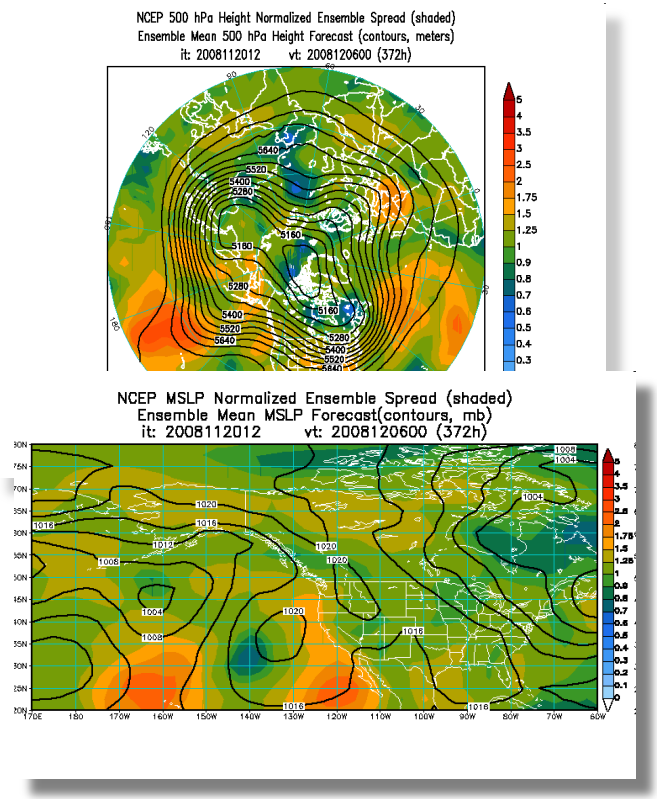
Focus Area: Multi-Model Ensembles

Goal

A multi-model ensemble prediction system that leverages the best national and international models for improved predictions on intraseasonal-to-interannual time scales

Activities

- **Consolidation techniques**
- **Verification**
- **MME Prediction System**
  - ***International MME***
    - ➔ ***NCEP, ECMWF, Meteo-France, and UKMET***
  - ***National MME***
    - ➔ ***NCEP, GFDL, NASA, NCAR***
      - **Collaboration with NSF, NCAR, COLA, NCEP, GFDL, and CPO**
      - **Drafting white paper**



Focus Area: Climate Forecast Products

Goal

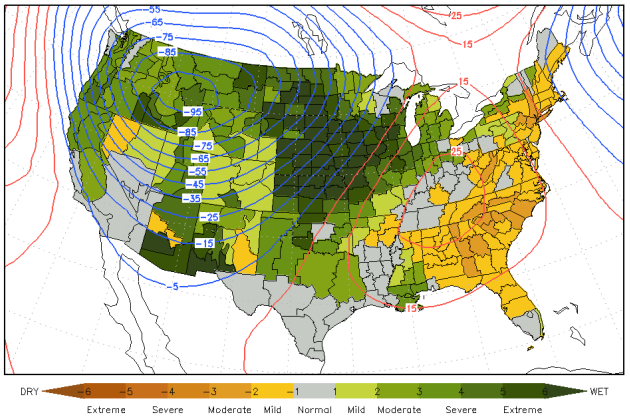
To provide reliable climate forecast products that are responsive to the needs of users and incorporate state-of-the-art science and research

- *Relationships with partners*
- *Delivery of useful products*
- *Continuous flow of user requirements*
- *Strong research component*

NIDIS

Activities

- Extreme event products for operational applications
- GIS capabilities in GrADS
- Drought monitoring and forecast products in support of NIDIS
- CPC-RISA program to develop a user discovery process for developing climate products
- Provide CFS data for use in developing vegetation stress index



CTB Funded Projects

CTB research program funded 12 proposals during FY2009

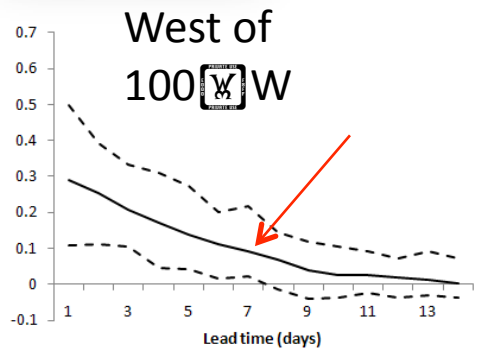
➔ 1 in its 3rd and final year
➔ 5 in the 2nd of 3 years
➔ 6 new proposals funded

• Total funding during FY09 was around 2.5 million dollars

• The six new starts receiving funding to cover the first two years

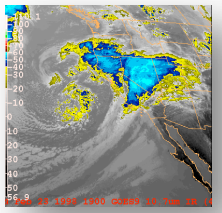
Probabilistic Forecasts of Extreme Events and Weather Hazards over the U.S

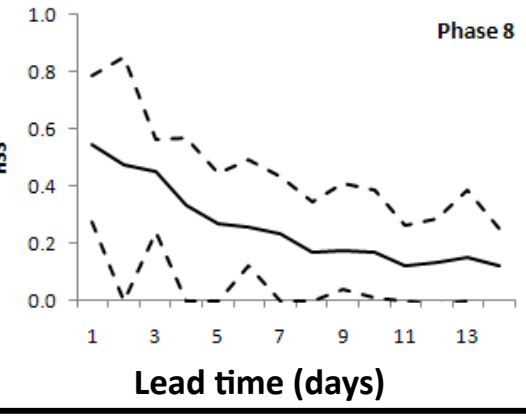
Charles Jones[1], Leila M. V. Carvalho[1,2] and Jon Gottschalck[3]
[1]ICESS, [2]Department of Geography, University of California Santa Barbara
[3]Climate Prediction Center, NOAA / NCEP



Heidke skill scores of forecasts of heavy precipitation (exceeding 90th percentile) (November-March). Solid lines represent mean HSS over the western/eastern domains; upper/lower dashed lines indicate the max/min HSS values.

In general skillful forecasts of extreme precipitation (HSS 0.1) extend to about 7 days lead





Heidke skill scores of extreme precipitation (exceeding 90th percentile) in the contiguous United States when the Madden-Julian Oscillation (MJO) is active and the convective signal is in the tropical western Pacific. Solid lines represent the mean; upper/lower dashed lines indicate the max/min HSS values within the US.

The Madden-Julian Oscillation significantly modulates forecast skills of extreme precipitation in the United States during winter. Skillful forecasts of extreme precipitation extend to Week-2

GrADS-GIS in Operations at the NOAA Climate Prediction Center

ftp://ftp.cpc.ncep.noaa.gov/GIS/GRADS_GIS/GeoTIFF/

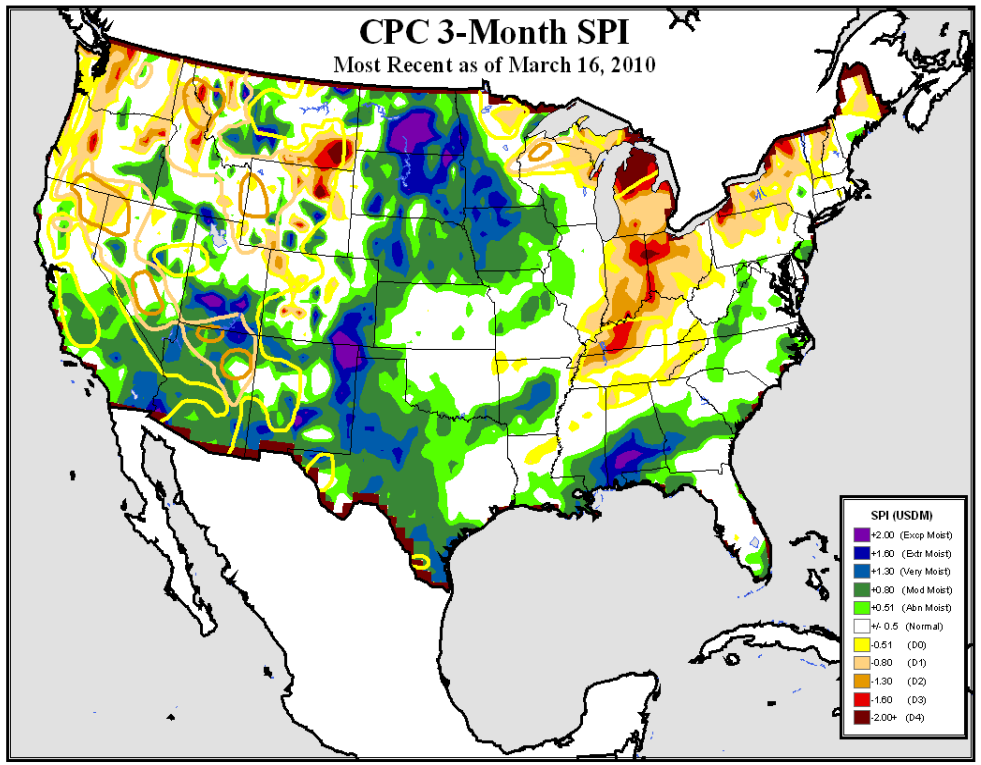
Data Currently Available

Up to higher level directory

03/11/2010 10:00AM	Directory	CMORPH_DLY
12/09/2009 09:47AM	Directory	GLB_DLY_PREC
03/04/2010 12:01PM	Directory	PREC_FORECAST
03/12/2010 03:20PM	Directory	QMORPH_8km
03/11/2010 04:00PM	Directory	SPI
03/02/2010 11:13AM	Directory	SST

The GeoTIFF data are being created based on user requests

USDA overlays the US Drought Monitor with the SPI GeoTIFF layer



CTB Seminar Series

2009-2010 Schedule of Speakers

Seminars at NCEP and COLA are 2:00 -3:00 pm on Wednesdays unless otherwise noted.
NCEP location is WWB 707 unless otherwise noted.
ESSIC Seminars are 12:00 -1:00 pm on the 4th floor. Please RSVP to Rong-Hua Zhang at rzhang@essic.umd.edu
One hour is reserved afterwards for discussion.

#	Date	Location	Speaker	Title
1	19-Oct	NCEP (Mon)	Raghu Murtugudde, UMD	Pathogens, HABs, Swine flu: What can CTB do?
2	3-Nov	NCEP (Tues)	Ron Zhang, ESSIC/UMD	Ocean Biology-Induced Climate Feedback Effects on Interannual Variability in the Tropical Pacific: A Missing Process in the NCEP CFS
3	19-Nov	COLA (Thurs)	Yan Xue, NCEP/CPC	The NCEP GODAS Ocean Analysis of the Tropical Pacific Mixed Layer Heat Budget on Seasonal to Interannual Time Scales
4	[illegible]	CFP	[illegible]	Droughts over the US Great Plains and the Indo-Gangetic Plain: The Remarkable Influence [illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]
6	3-Feb	NCEP	Randy Wu, COLA	ENSO prediction skill in the CFS
7	9-Feb	To be rescheduled (snow storm)	Wei-Kuo Tao, NASA	NASA Multi-scale Modeling System with Unified Physics
8	24-Feb	To be rescheduled	[illegible]	[illegible] ultra-high resolution global [illegible] prediction
9	24-Mar	COLA	Ronggian Yang, EMC	Impact of coupled versus observed SST on summer season precipitation over the America with the NCEP CFS using different land surface models and initial conditions
10	[illegible]	[illegible]	[illegible]	[illegible]
11	14-Apr	NASA	Rongtse Mo, CPC; Michael Ek, EMC; Randy Koster, GSFC	Objective Drought Monitoring and Prediction
12	28-Apr	NCEP	Dev Nyogi, Purdue University; Indiana State Climatologist	Postponed
13	10-May	ESSIC (Mon)	Song Yang, NCEP/CPC	Simulation and Prediction of the Asian, Australian and Indo-Pacific Climate by the NCEP CFS
14	26-May	NCEP	Kelly Redmond, DRI	TBD
15	16-Jun	COLA	Kay Ide, UMd	TBD

Schedule and past presentations available at www.cpc.ncep.noaa.gov/products/ctb

Model Test Facility (O2R)

To Accelerate R2O - Must Support O2R

Objective:

To accelerate improvements in CFS by providing it (and supporting datasets) to the research community

Deliverables:

CFS, data, and support services to external research community, annual users workshop on CFS

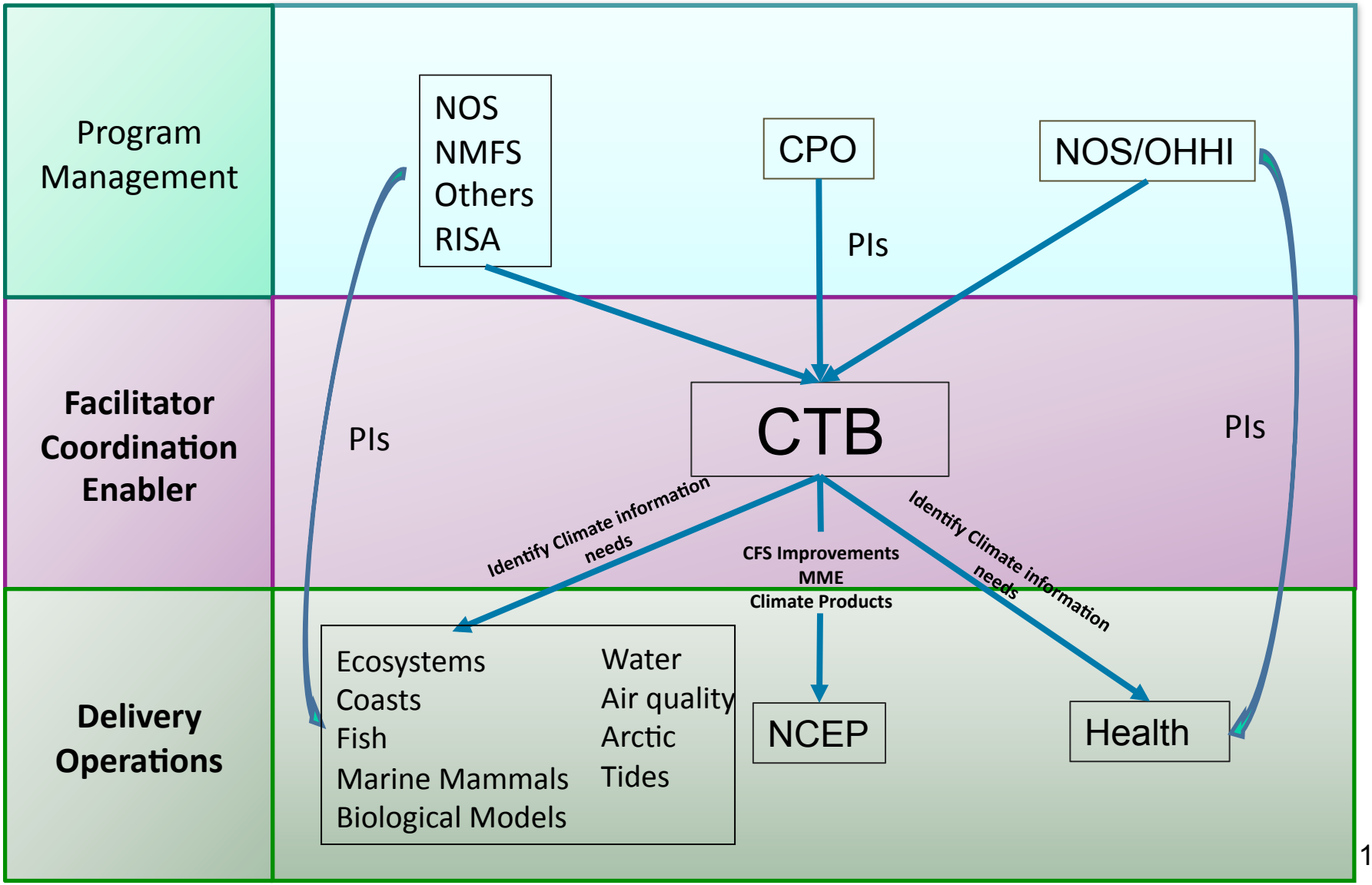
Benefits:

Provides support for research with CFS outside NCEP

Maximizes opportunities for community participation in developing improvements for CFS

The Future Climate Testbed

Links to other NOAA programs to facilitate the incorporation of relevant climate information into their respective programs



Thank you, questions or comments?

Fiona.Horsfall@noaa.gov
Jon.Gottschalck@noaa.gov

CPASW Panel

Improving NWS Products and Services in Partnership with the External Community

Objective

- To develop actions for partnerships between CPC/CSD and RISAs, ARCs, RCCs, SCs, academia, and others to enhance the CPC product suite by
  - Bringing requests from their users to CPC for products and services
  - Identifying areas in which partners can work with CPC to develop new products in response to emerging needs of users (and freshen CPC products)
  - Establishing use and usefulness of NWS climate products and services

Expected Outcomes

- Recommendations for improving NWS products and services
- Identified partnerships/projects to improve and develop new NWS products

Proposed CTB Charter

Present

- Oversight Board
- Science Advisory Board
- Announcement of Opportunity (AO)
- NCEP Co-PI identified in advance
- LOI
- Proposals
- Links to NIDIS

Future

- Steering Committee (SC)
- Science teams to work with PIs
- Visiting scientists and post-docs
- AO/LOI with CTB, SC involvement
- Proposals evaluated with criteria from CTB, SC
- NCEP Co-PI tbd
- Project relevance to society in general

Additional CTB Activities

- CPC to stage subset of CFSR data for community as part of Model Test Facility

- Complete conversion of CPC operational monitoring products from CDAS-based to CFSR-based

- Developing climate products in partnership with the external community

Developing Climate Products in Partnership with the External Community

Strategy Objective

- To enhance the CPC product suite to make it more responsive to the needs of our users

- To engage our partners in doing the above